Associate of Science in Engineering (ASE) Overview

Rationale:

Community college students across Maryland are interested in earning baccalaureate degrees in engineering; however, they confront a series of challenges when trying to transfer into four-year engineering programs. Maryland two- and four-year engineering programs differ greatly from institution to institution in courses required, which can be confusing to students. The systems currently in place do not assist students in maximizing credit transfer. Students may take courses that transfer to one school but not to another. Existing articulation agreements are such that students should have a clear idea of a target four-year program before beginning a two-year program. To better serve students, to retain more students in engineering, and to better serve Maryland industry needs for engineers, the pathways from two-year to four-year engineering programs should be as seamless as possible.

Maryland has a growing need for engineers in various fields, including electrical and computer engineers. Currently, there are more annual job openings for electrical and computer engineers than there are graduates (see attached data from *The Report of the Workforce Advisory Council*, Maryland Higher Education Commission, January 2008). The Occupational Information Network also lists these fields as in demand nationally, and they are important to some of Maryland's largest employers, including the aerospace and defense industries. With the demand for engineers rising in Maryland, due in part to the Base Realignment and Closure and to a focus on state growth in STEM fields, this is an opportune time to re-examine the two-year engineering transfer degree and for faculty to improve the alignment between two-year and four-year engineering programs.

Background:

Two years ago, the University System of Maryland (USM) and the Maryland Association of Community Colleges (MACC) Joint Leadership Council endorsed the concept of a new engineering transfer degree and requested the Maryland Higher Education Commission (MHEC) to move forward with this initiative. Informing this concept was the successful model of the Associate of Arts in Teaching (AAT), developed since 2001. Using the structure and collaborative process of the AAT as a model, MHEC established the Associate of Science in Engineering (ASE) Oversight Council.

Nominations were sought from the education segments and other stakeholders to create the ASE Oversight Council, which has representation from two-year and four-year institutions that have engineering programs. The 20-member ASE Oversight Council includes representation from the National Academy of Engineering, the Maryland Association of Community Colleges, the University System of Maryland, Morgan State University, the Maryland Independent College and University Association, and the Maryland State Departments of Education and Business and Economic Development. MHEC staffs the Council, which has three co-chairs, one from an independent institution, one from a public-four year institution, and one from a two-year institution.

Electrical Engineering and Computer Engineering were selected for the first phase of this work. Via nominations from a variety of institutions, the Electrical and Computer Engineering (ECE) Faculty Disciplinary committee was formed. Its membership currently includes faculty from the following:

Anne Arundel Community College
Capitol College
College of Southern Maryland
Columbia Union College
Community College of Baltimore County
Howard Community College
The Johns Hopkins University
Montgomery College
Morgan State University
Prince George's Community College
University of Maryland, Baltimore County
University of Maryland, College Park

September 23, 2008

The ASE Oversight Council charged the ECE faculty group with the following goal and objectives:

Goal and Objectives:

The goal is to maximize the alignment of the two-year engineering transfer degree and the four-year engineering degree with the ultimate goal of increasing the total number of engineering baccalaureate graduates produced in Maryland. The objective is to ensure that the two-year engineering transfer degree offered by Maryland institutions will:

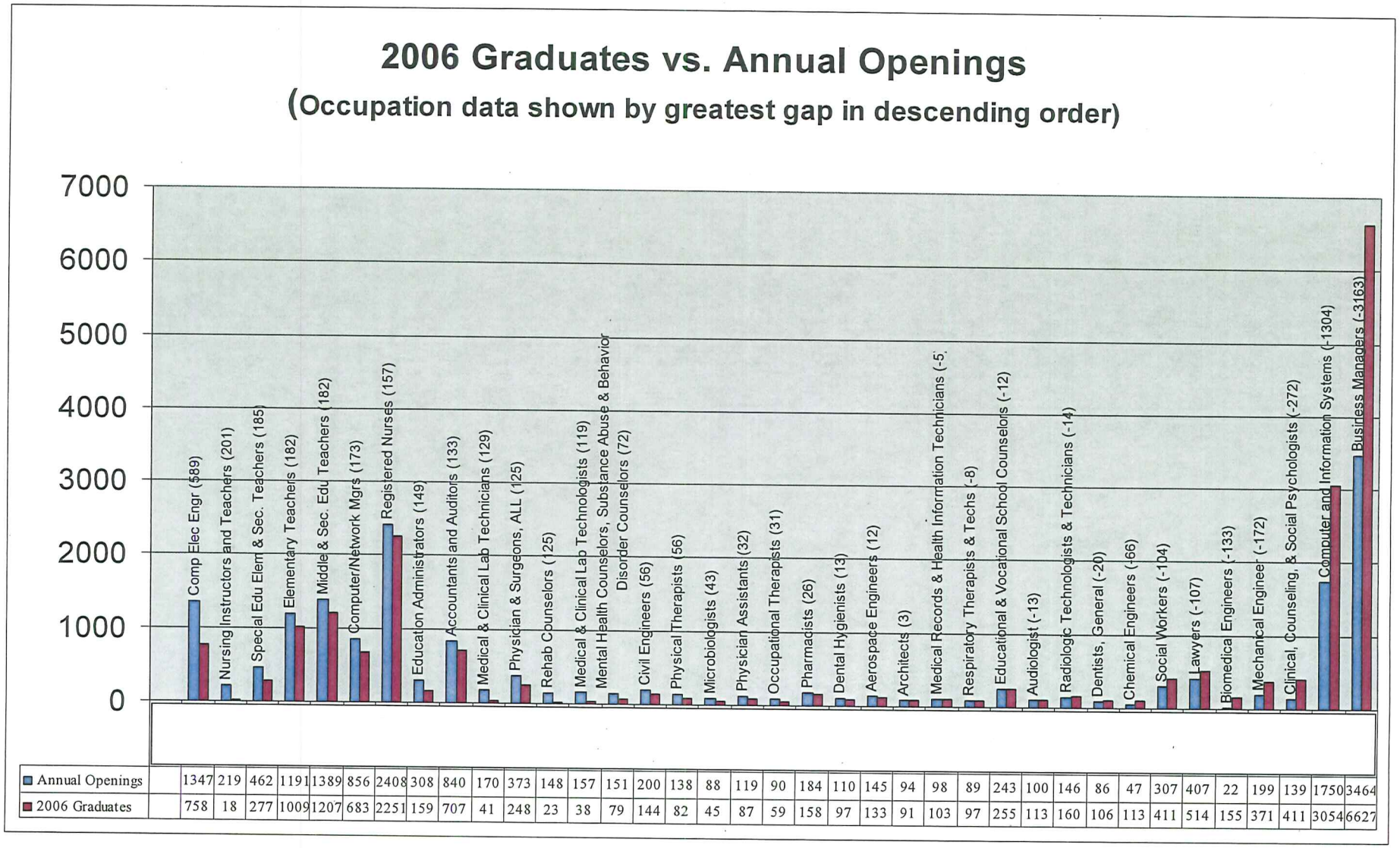
1. Maximize the transfer of credits applied towards the major and minimize time to degree.
2. Provide a common core of student outcomes for the first two years of the major.
3. Provide innovative, collaborative methods by which students at two-year colleges across the state may achieve the learning outcomes required for transfer (e.g., opportunities for students to take specialized courses via distance education, through summer bridge programs, or by attending other designated community colleges across the state).
4. Permit transfer without further course-by-course review by individual four-year institutions for the common core of student outcomes.
5. Provide students attending two-year institutions with a clear road map for transfer into four-year engineering programs in Maryland.

Key elements of the proposed ASE that are comparable to the AAT:

- The degree is based on outcomes collaboratively developed by Maryland two- and four-year faculty in the appropriate disciplines.
- Students who earn an ASE must still apply for transfer as usual; there is no guarantee of admission to a four-year program.
- Four-year programs retain their admission standards and control their admission process.
- Once admitted as a transfer student to a four-year program (in the same field as that of the earned ASE), the student's degree transfers as a whole—there is no course-by-course review of credits for transfer.
- Individual two-year institutions decide if they want to participate and then must file a new program application with MHEC. That application must include an ASE attachment that shows how that institution's proposed program curriculum meets each and every outcome agreed to by the faculty discipline group and the ASE Oversight Council.
- Faculty groups will convene at least annually to ensure that outcomes remain state-of-the-art.
- The ASE Oversight Council will meet at regular intervals to review administrative concerns and program outcomes.

The ASE Oversight Committee and ECE faculty disciplinary committee have been diligently working over the past twelve months to develop the *draft* articulated program outcomes for the proposed ASE in Electrical Engineering and the ASE in Computer Engineering. These are the foundation documents that shape the proposed new degrees.

The next phase of the process in developing an ASE degree program is to provide an opportunity for all higher education institutions to respond to these draft outcomes. **It is critically important that *all* institutions that receive transfer students in electrical or computer engineering participate in this process. To work as seamlessly as the AAT, it is important that all independent and public four-year institutions with relevant programs participate in this review process and feel comfortable with the outcomes.**



Source: 2004-2014 Occupational Projections – Department of Labor Licensing and Regulation & MHEC Degree Information System

Appendix G

Comparison of Annual Openings and Graduation Data

Occupations	Annual Openings	2006 Graduates	Difference Between Projected Total Annual Openings & Graduates in 2006	
			#	%
Computer and Electrical Engineer	1347	758	589	44%
Health Specialties Teachers, Postsecondary & Nursing Instructors and Teachers	219	18	201	92%
Special Education Elementary & Secondary Teachers	462	277	185	40%
Elementary Teachers	1191	1009	182	15%
Middle and Secondary Education Teachers	1389	1207	182	13%
Computer/Network Managers	856	683	173	20%
Registered Nurses	2,408	2,251	157	7%
Education Administrators	308	159	149	48%
Accountants and Auditors	840	707	133	16%
Medical and Clinical Laboratory Technicians	170	41	129	76%
Physician and Surgeons, ALL	373	248	125	34%
Rehabilitation Counselors	148	23	125	84%
Medical and Clinical Laboratory Technologists	157	38	119	76%
Mental Health Counselors, Substance Abuse and Behavior Disorder Counselors	151	79	72	48%
Civil Engineers	200	144	56	28%
Physical Therapists	138	82	56	41%
Microbiologists	88	45	43	49%
Physician Assistants	119	87	32	27%
Occupational Therapists	90	59	31	34%
Pharmacists	184	158	26	14%
Dental Hygienists	110	97	13	12%
Aerospace Engineers	145	133	12	8%
Architects	94	91	3	3%
Medical Records and Health Information Technicians	98	103	-5	-5%
Respiratory Therapists & Techs	89	97	-8	-9%
Educational & Vocational School Counselors	243	255	-12	-5%
Audiologist Speech-Language Pathologists & Audiologists	100	113	-13	-13%
Radiologic Technologists and Technicians	146	160	-14	-10%
Dentists, General	86	106	-20	-23%
Chemical Engineers	47	113	-66	-140%
Social Workers	307	411	-104	-34%
Lawyers	407	514	-107	-26%
Biomedical Engineers	22	155	-133	-605%
Mechanical Engineer	199	371	-172	-86%
Clinical, Counseling, and Social Psychologists	139	411	-272	-196%
Computer and Information Systems	1750	3054	-1304	-75%
Business Managers	3464	6627	-3163	-91%

Source: 2004-2014 Occupational Projections – Department of Labor Licensing and Regulation & MHEC Degree Information System